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LEAKAGE IN DISTRIBUTION

THE magnitude of the distribution system of the Gas Light and Coke Company, extending as it does over 547 sq. miles, serving a million consumers through 6,254 miles of mains and an almost equal length of service pipes, affords a unique opportunity for the investigation of gas leakage and its causes. The variety in the pressures employed in the several sections of this vast area make the observations presented by Mr. C. D. Shann to the London Juniors all the more valuable. Mr. Shann has had the advantage of serving under two Chiefs, the late Mr. Stephen Lacey and Mr. H. J. Escreet, whose names are household words in the province of gas distribution.

In the London area gas is distributed at from 4 to 5 in. W.G. Medium pressure, ranging from 15 to 150 in., is used for conveyance to gasholder stations and governors, and high pressure from 10 to 35 lb. per sq. in. for transmission over long distances in South Essex. Of the causes for unaccounted-for gas, 3% out of the average 4% is attributed to differences in temperature, pressure, and humidity between the station and consumers' meters; in other words, it is no real loss at all. This is an important point because it substantiates the claim that gas distribution is a system of potential district heating without appreciable loss in transmission. Actual leakage is practically confined to that at joints and fractures and to perforations caused by corrosion. Other causes are not individually serious. Joints and fractures (of cast-iron pipes) are inter-related because, while longer pipes reduce the number of joints in the system, they are essentially more liable to fracture. The Author comes to the conclusion, after a careful study of all the factors involved, that on the whole the longer pipe, appropriately stronger, with flexible joints is an overall saving. The use of rubber in joints gives encouraging results, and the same is claimed for leak clamps with rubber gaskets, but the point is stressed that it takes a long time, perhaps as much as 10 years, to judge the success or failure of any one step to effect improvement, during which time other factors may have varied. An interesting remark is that leakage is reduced where mains are laid in a wet clay subsoil, increasing when the soil dries out. It is disappointing that gas dehydration increases leakage, particularly from spigot and socket lead joints. We suggest that this should not be taken to outweigh the advantages of dry gas in the reduction of corrosion and in the elimination of syphon-pumping.

The effect of ground frost in increasing pipe fractures is not apparently very well understood. Fractures certainly do increase with sudden falls of temperature at main level even though this does not go below 40°F. at a depth of one foot. It is not to be explained by actual freezing of the subsoil round the pipe but it is suggested that the freezing of the surface causes subsoil movements leading to bending stresses in the pipe which may result in fracture. Corrosion renders the use of steel to reduce pipe fracture somewhat unsatisfactory. Steel must be used in the high pressure mains, but the problem of coating and protecting the metal is still largely unsolved. At the same time this great Company's considered policy, of replacing all existing 2 in. and 3 in. cast-iron pipes either by steel pipes of the same diameter or by 4 in. cast-iron pipes, should be noted.

Mr. Shann is quite justified in using the occasion to describe the magnificent work done by his Company in coping with the effects of enemy action on the distribution system. A fractured 48 in. main is an experience which falls to few. But we refrain from further comment except to repeat our admiration of the brave people who bore the brunt of the work and of the consummate skill and ability with which their efforts were organized and directed.

WELL DONE

WE referred last week to the success with which the Gas Light and Coke Company had weathered the storms of the past year. That the world's largest gas undertaking is not unique in that respect is shown by the results of the other London Companies. Of those over which Mr. Frank H. Jones presides perhaps the two most interesting are the Commercial and the South Metropolitan. Stockholders of the former bore a disproportionate share of the financial burdens of the war. The Company early felt in full force the effects of evacuation and in greater force than any other Company in London the effects of enemy action. The ordinary dividend was reduced to 3% in 1939 and to 1½% in 1940. The 1940 payment, however, which was paid as an interim dividend, having regard to the experience of the Company in the first half of the year, was necessarily carried forward as a loss, since the year as a whole showed a large deficit. For the four years 1941-44 inclusive no dividend at all was paid, but 1945 saw a small dividend of 2%. The resumption of the basic dividend of 5% means that the Company has done better than for some years, and there is every hope that the improvement will continue.

Similarly, the South Metropolitan passed through a severe trial during the war, and, after paying no dividend for 1941, paid 1% for 1942, 3% for 1943, 2% for 1944 and 4% for 1945. Maintenance of the recovery which began in the second half of 1945 has now enabled the Company to pay the full basic dividend of 5% for the past year. This is the first time since 1938 that the balance of profit has allowed of a distribution of a basic dividend, and it was therefore with particular pleasure that the Chairman placed the Directors' recommendation before the proprietors Wandsworth and South Suburban have maintained their dividends at 5%, the same as for some years past.

The Croydon Gas Company, over which Mr. William Cash presides, and which attains its centenary this year, has maintained its dividend at 6%. In common with all the other

undertakings in the Greater London area, the Company has had to meet increased demands for gas. While the general tendency is for the price of gas to increase, Croydon has been in the happy position of being able to reduce the price, as from the beginning of this year, from the 1946 figure of 13.2d. per therm to 12.6d. per therm

"CONFISCATION"

CONFIDENCE in the future of the Gas Industry has been the keynote of all the Company meetings we have so far reported this year—with one reservation—the probable effects of nationalization. And the gravest aspect of nationalization is the question of compensation. The compensation terms proposed for the electricity industry, if applied to gas, would, it has been emphasized, inflict on numberless small investors a serious diminution of income. At the South Metropolitan meeting Mr. Frank H. Jones gave some pertinent facts about the ownership of the undertaking. At the end of 1946 there were 17,457 holders of ordinary stock, of whom 7,578 held up to £100, 7,489 from £101 to £500, 1,452 from £501 to £1,000, and 938 (largely institutions and trustees for pensions and other funds) held more than £1,000. Included in these numbers were 6,346 employees and pensioners. There is, as he pointed out, little sign of the "financial speculator" here; rather the evidence is of the thrifty citizen who has not looked for large dividends or appreciation, but, content with a modest return, has done his best to provide from his savings something for his dependents or his own old age. "If the proposals in the Electricity Bill are to pass unamended," continued Mr. Jones, "and are to be a pattern for a Gas Bill, stockholders are to suffer an enforced conversion which is tantamount to the confiscation of a third or even more of their income from their holdings."

A month ago we reported the British Gas Council's criticism of the Government proposal to adopt Stock Exchange prices as the basis for assessing the compensation to be paid to holders of securities in nationalized undertakings. In the case of electricity stocks at least it is clear that Stock Exchange prices have been artificially restrained by the prospect of nationalization from participating in the general rise in prices experienced, as a direct result of the Government's "cheap money" policy, by Government issues and by every other class of sound security. Referring to the "fallacies and inequities" of Stock Exchange quotations as the basis of compensation for public utility stocks, Mr. Jones told the South Metropolitan proprietors that one could only hope and press that, whether it be transport, gas, or electricity which was being disinherited, some more equitable and creditable basis of compensation would be instituted than the Government had so far conceded. Mr. Cash was equally emphatic in his address to the Croydon shareholders, and quoted the speech of the Hon. Rupert E. Beckett at the annual meeting of the Westminster Bank. After referring to the immediate difficulties with regard to coal, national credit, and industrial production, Mr. Beckett said, with regard to nationalization, "I do question the timeliness of so radical and far-reaching a change at the present juncture."

BOMBAY GAS COMPANY

THE March of Time continues as to the disappearance of Britain's overseas investments. This time the old established Bombay Gas Company has passed from British to Indian control, thus following the trend of events to-day in the case of many of the Indian railways, the Argentine railways and many others. The Bombay Gas Company was first registered in this country in 1862 and for many years it was very slow to develop, mainly due to economic conditions in India, such as plague, pestilence, and famine. Another reason perhaps was the action of the original Directors in issuing capital to the amount of £260,000 and paying dividends instead of building up reserves and ploughing back a proportion of the profits into the Company's funds. Up to 1905 the total sale of gas per annum had only reached 128 million cu.ft. with the total issued capital at £240,000, and £1,752 spent per million cu.ft. sold.

About this time a new regime took over the Directorate, the Management in Bombay and the Secretaryship in London, and the Company began to go right ahead. Such well-known names in the Gas Industry as Henry Edward Jones, Charles Gandon, Charles Hunt and William Graham Bradshaw now controlled the policy of the Company. The works in Bombay were in charge of Arthur Rodney Burch, who was given every encouragement to enlarge and develop. Ten years later the sale of gas had risen to 249 million cu.ft., and the cost per million cu.ft. sold had been reduced to £1,268. Progress continued under this "live" regime and 20 years later the sale had increased to 368 million cu.ft. and the capital spent per million cu.ft. sold had been reduced to £980. Changes then occurred in both the Directorate and the Bombay Management. The death of Mr. H. E. Jones left the Company the poorer, but his place was taken by an equally dynamic personage in William Graham Bradshaw, who was to be joined by Arthur Matthews Paddon and Stanley Hunter Jones (later to become Chairman). The Company continued to progress and no one did more to push its activities ahead than William Thomas Lane, the General Manager and Engineer in Bombay, who had taken the place of Mr. Burch, retired. Seeing that Mr. Lane had been in service of the Company since 1900 he was well fitted to control the Company in India. The teamwork of the Directorate and Mr. Lane are amply proved when the following figures are examined:

Year.	Sale of Gas. mill. cu.ft.	Capital Spent per mill. cu.ft. sold.
1925	368	£980
1930	469	£834
1935	504	£773
1940	661	£610
1945	1,100	£374

The capital issued is only £300,000, which speaks well for the policy of the Directors. The Indian control is going to benefit from this careful and prudent policy of the Directors of the past 40 years. All the Directors, London Staff, and London Auditors have resigned or have had their services terminated. The Bombay Gas Company has always had a strong and representative Board, especially during the nineteenth century. In addition to those already mentioned, one calls to mind Field Marshal Sir Evelyn Wood, V.C., Hugh Henderson Mcleod, Bertram Ellis, B. Murton Gill, and Sir George Evetts, O.B.E. All of them have been connected with the Gas Industry or with India, either technically or in an administrative capacity. The gas interests of the Jones family, for instance, go back nearly 100 years; the Paddon family and the Gill family nearly as long. Sir George Evetts has been connected with the Company since the days when he was articled to the late H. E. Jones some 47 years ago.

No one will regret the change more than the Secretary, Mr. E. Comber, who succeeded Mr. Alexander Dickson in 1932, and who has been in the service of the Company since April, 1902. His genial manner, coupled with a severe attitude if necessary, will be missed by his many friends in the Gas Industry. He has seen the Company grow from an insignificant 100 million cu.ft. sale of gas per annum to 1,100 million cu.ft., and he has had no small part in helping the Board in their successful deliberations. The Accountant, Mr. M. E. Bush, whom many people know in the Industry and who has completed nearly 38 years of faithful service, will eventually follow into retirement. Mr. A. R. Burch and Mr. William T. Lane, both stalwarts in the Company's service

in Bombay, are still alive although over the three score years and ten.

So the Bombay Gas Company, Ltd., will be shortly saying goodbye to all in England, thanks for a lot, and God Speed to the old country.

The Coal Cut

One of the entries in the diary of the fuel crisis which we published last week was the request issued on Feb. 21 by the Ministry of Fuel and Power to all gas undertakings to reduce over the whole 10-week period from Feb. 22 to May 2 inclusive, the amount of coal carbonized by 10% of the actual tonnage carbonized in the 10-week period (excluding Christmas week) ended Feb. 14. How this could be done, particularly in cases where oil gas was already being used flat out to hold the load, was a question raised at a meeting of the Southern Association of Gas Engineers and Managers (Eastern District) on Feb. 25. One answer was that in the normal course of events, provided the bad weather broke, presumably they would be shutting down certain beds for re-setting; and having regard to the fact that the basic period was the 10 weeks from Nov. 30 onwards, which was a period of peak consumption for most undertakings, they ought to be able to save if the weather improved shortly, particularly those who were carbonizing as much oil as they could in their water gas plant and had also gone to the further length of carbonizing oil in horizontal retorts. It was urged that an important point of principle arose. The Ministry, if they could possibly do so, would get out of directing the public to economize or putting the responsibility on to the public; in other words, the Ministry would cut the coal consumption by the gas undertakings, and leave them to find ways and means of making the public economize. The Ministry ought to take the responsibility for forcing on the public the economies required. It might well be that the Gas Industry would be asked to save 20%, or perhaps 30%, and would get the blame from consumers for not supplying gas. The Ministry had realized that it was exceedingly difficult to ration gas at all, and had not taken what seemed to be the most straightforward step, suggested by the British Gas Council, in its "BGC Plan A47," which meant cutting off supplies to non-essential industries.

Coloured Inset facing p. 501

The advertisement in colour facing p. 501 was prepared by Messrs. Humphreys & Glasgow, Ltd., to appear as the "JOURNAL" front cover on Feb. 26. As this was one of the issues banned by the Government's Emergency Fuel Restrictions we have reproduced the advertisement as a coloured inset this week.

Personal

Mr. R. W. FOULDS, Deputy Gas Engineer of the Carlisle Gas Department since June, 1945, has been appointed Engineer and Manager at Brighouse. Mr. Foulds received his early training with Southport Gas Department and became Chief Technical Assistant. In 1942 he was appointed Deputy Engineer at Leigh (Lancs) and three years afterwards took up his post at Carlisle.

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Mr. T. R. COOK, Engineer and General Manager of the Blackpool Gas Department and President of the Manchester District Association of Gas Engineers for 1947-8, was a guest of honour in his Department on Feb. 27. Mr. T. V. Blake, Assistant Engineer, proposed the toast of Mr. and Mrs. Cook, and Mr. Cook, in reply, said he would always look after the interests of his staff, whom he thanked for their support.

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Mr. THOMAS STIRLING, Assistant Engineer and Manager to the Helensburgh Gas Department, has been appointed Technical Assistant to the British Gas Light Company at their Norwich station. Mr. Stirling, who was trained at Kirkintilloch and served for five years in the R.A.F., joined the staff at Helensburgh shortly after being demobilized in the early part of last summer.

Obituary

The death is reported of Mr. JAMES W. GIBBONS, who, until his retirement in 1938, was for many years in the service of the Gas Light and Coke Company. He was 68 years of age. His son, Mr. S. J. Gibbons, is the Hon. Treasurer of the London and Southern District Junior Gas Association.

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The death is recorded of Mr. JAMES B. STEWART, late Distribution Superintendent of the Rochdale Gas Department. A founder member of the Lancashire and District Gas Salesmen's Circle, past Chairman and Hon. Life Member, Mr. Stewart was held in high regard by a wide circle of friends within the Industry.

Southern Association (Eastern District)

At a meeting of the Southern Association of Gas Engineers and Managers (Eastern District) at Gas Industry House on Feb. 25, it was announced that the Committee had elected the following officers for the coming session in accordance with the new rules: Chairman, H. J. Escreet (Gas Light and Coke Company); Vice-Chairman, W. K. Tate (Portsmouth); Hon. Secretary, J. M. Webber (Croydon).

Mr. D. B. Parkinson, Dr. S. Pexton, Mr. W. A. Barnett and Dr. A. E. Haffner were elected representatives on the Council of the Southern Association, in place of those retiring in June, 1947, and to serve for three years.

The meeting elected the following (who had been nominated by the Committee) to serve on the District Committee for the Session 1947-48: L. Muir Wilson (South Metropolitan Gas Company), E. O. Rose (Tottenham), H. Bradley (Gas Light and Coke Company), C. H. Chester (Swindon), R. G. A. Clark (Dover), S. L. Wright (Deal).

Four representatives to serve on the Gas Education Committee of the Institution of Gas Engineers were announced as follows: Colonel J. A. Gould (Chairman), G. L. Braidwood, G. H. Kenyon, Dr. A. E. Haffner. The first three had served last year on the Gas Education Committee. Dr. Haffner was elected in place of Mr. J. H. Dyde, who was already a member of the Gas Education Committee.

Diary

Mar. 13.—Women's Gas Council: Headquarters Members' Meeting, 2.30 p.m., Good Housekeeping Institute, 46, Grosvenor Gardens, S.W.1.

Mar. 14.—North of England Gas Managers' Association (Auxiliary Section): "Review of the Post-war Period at Middlesbrough," S. Jones. Council Chamber, Municipal Buildings, Middlesbrough, 2.45 p.m.

Mar. 15.—Yorkshire Junior Gas Association: "Catalytic Sulphur Removal," J. Edgar, Mirfield; "Demand, Supply, and Consumer," W. Dickson, (York). Leeds Gas Department, Bridge Street Depot, 2.30 p.m.

Mar. 17.—London and Counties Coke Association: Finance Committee, 11 a.m.; Executive Committee, 11.30 a.m.; Central Committee, 1.30 p.m. Gas Industry House.

Mar. 19.—B.G.C. Domestic Development Committee: Technical Sub-Committee, 10 a.m., Watson House.

Mar. 19.—Manchester and District Junior Gas Association: Joint Meeting with the Institute of Fuel (Yorkshire Section) and other Associations, Sheffield. "Factors Influencing the Design, Construction, and Operation of Coke Ovens," D. T. Barritt and Dr. J. Hamilton.

Mar. 20.—Midland Association of Gas Engineers and Managers: Annual General Meeting. Queen's Hotel, Birmingham, 2.30 p.m.

Mar. 21.—London and Southern District Junior Gas Association: Reception and Dance.

Mar. 22.—London and Southern District Junior Gas Association: Convention (Technical Conference).

Mar. 22.—Midland Junior Gas Association: President's Day.

Mar. 22.—Manchester and District Junior Gas Association: Joint visit with Midland Junior Gas Association. Morning visits to British Refractories Research Laboratories and Gas-fired Pottery Works; afternoon visit to Stoke-on-Trent Gas-works.

Mar. 27.—Industrial Gas Development Committee, 10.30 a.m., Gas Industry House.

Mar. 27.—Midland Counties Coke Association: Annual General Meeting, King Edward House, Birmingham, 2.30 p.m.

April 14.—London and Counties Coke Association: Technical Committee, 2.30 p.m. Gas Industry House.

News in Brief

Cannock District Gas Company has this month introduced the production of gas from heavy oil, hoping by this process to save 3,000 tons of coal a year. The saving will amount to about 20% of the Company's present annual consumption.

Barralets, Ltd., gas water heater manufacturers, have acquired the whole of the shares of Pressform, Ltd., of Billingshurst, Sessex, who will in future manufacture certain of Barralets' post-war models, and will thus supplement the already expanding output from Addington Square. This is part of Barralets' programme to meet post-war requirements.

A Successful Film Display was recently provided by the Cheltenham and District Gas Company in its demonstration theatre at Cheltenham. Films selected included "Through the Mill" and "Job 99—Pluto." The show, which was given under the auspices of Stewarts & Lloyds, Ltd., was attended by Local Government officers and officials of Gloucester Gas Light Company and Cheltenham and District gas Company.

Improvements to the Gas Plant of the Sedgley Urban District Council were indicated at a meeting of the Council on Feb. 25, when recommendations of the Gas Committee were approved to raise loans for carbonizing plant, proposed high pressure main and carburetted water gas plant, amounting to £84,000. The Council also agreed to a specification and tender amounting to £50,891 in respect of carbonizing plant with coal and coke handling plant.

The Bury St. Edmunds Gas Company held its Ordinary General Meeting recently and it was disclosed that during the past few weeks, gas consumption rose 25% on the corresponding period last year. New plant had been on order for two years and a heavy main laying programme was being carried out. It might be necessary to increase the price of gas shortly. It was decided that a final dividend of 3%, less tax, be paid, making a total dividend for the year of 6%, less tax.

A New Gas Producing Plant, costing £43,500, was officially inaugurated by Buckhaven and Leven Gas Commissioners on Feb. 6. The plant includes eight new vertical retorts. Since 1921, annual consumption of gas has increased from 93 million cu.ft. to 283 million cu.ft., and Mr. H. A. Aitken, General Manager, declared that the new plant will meet not only the present increasing load, but increased consumption, which may be anticipated from new housing developments.

In a Competition for the best slogan summing up the urgent need for economy in gas consumption in Hereford, the first prize went to a woman for the slogan: "Wives of Hereford—Husband your gas." The second prize was also won by a woman with: "To speed recovery—Go slow with gas." Although there was a preponderance of entries from women among the more than 300 received the third prize was won by a man who sent in: "Be on your mettle—Watch light, fire and kettle." The competition judges were the editors of the two local newspapers, and the prizes were presented to the winners by the Mayor of Hereford on Feb. 8.

Edinburgh Gas Department has saved about 230 tons of coal per week since the street lighting restrictions were brought into force Mr. D. D. Melvin, Engineer and Manager, in a communication to the Town Clerk, recommends that street lamps should remain unlit for the present. Other steps proposed to effect a reduction in coal used were to increase the use of oil in the carburetted water gas plant, and to delay the restarting of the benzole plant. "The demand for gas usually commences to fall about this period," said the report, "and much depends upon the possible continuance of the present exceptionally cold weather, as to whether or not the reduction in coal usage can be achieved without reducing the normal supply pressures, and so effecting an enforced economy."

Manchester City Council has been told by Councillor C. E. P. Stott, Deputy Chairman of the Gas Committee, that unless urgently needed repairs and renewals can be carried out this summer Manchester will be worse off for gas-making plant next winter than has been the case this year. During this summer, he said, it would be essential to reconstruct one half of the vertical retort house at the Bradford Road works. This required 630 tons of steel, but the contractors had received only six tons, although demolition and other work had already begun. Promises of delivery were in most cases indefinite and in others too late to allow the completion of the work in time for next winter. The Gas Committee last May adopted a five-year plan of repairs and renewals which would provide for a 30% increase in gas-making capacity, but its success depended upon raw materials and labour being available. Referring to present reduced gas pressures, Councillor Stott said they were not due to shortage of gas—never had they produced more—but to the exceptionally high consumption. Coal stocks were satisfactory on a day-to-day basis, but while before the war they got 17,500 cu.ft. of gas per ton of coal, to-day they got only 15,500 cu.ft., due to the poorer quality of the coal. During the past 10 months 42% more gas has been sold than in the corresponding months of 1938-39.

Darlington Corporation has received sanction to borrow £19,340 for mains and £2,350 for services in connexion with the supply of gas to the Haughton-le-Skerne and Harris Street housing schemes.

Stirling Gas Light Company recently gave cookery demonstrations to the Stirling and Bridge of Allan Townswomen's Guild The demonstrations were opened by Mr. J. Forrester Millar, Chairman of the Company, who introduced the Demonstrator, Miss Aitken, of the Glasgow College of Domestic Science.

The Need for Additonal Gas Pressure in parts of Earl Shilton was raised at a meeting of Hinckley U.D.C. recently, and it was agreed to approve a proposal to install a pressure storage system on the site of the old gas-works in Station Road, at an estimated cost between £15,000 and £16,000. The scheme will be submitted to the Ministry of Fuel and Power.

It is estimated that Blackpool Corporation gas undertaking retains £40,000, the accumulated profits of users. Should gas nationalization be on the same terms as electricity, liquid assets will be absorbed, and neither ratepayers nor gas users will get the money. Some members feel that as these profits were made from users, they should have the benefit—say, a reduction of 2s. in the £ on accounts, instead of devoting the money to rate relief.

An Agreement has just been signed between the Association of Supervisory Staffs, Executives and Technicians and the Gas Light and Coke Company. This agreement follows a ballot vote of all the foremen employed at the twelve production works of the world's greatest gas undertaking as to whether they desired trade union representation or not. The result was a five to one majority in favour of A.S.S.E.T. representing the interests of the foremen.

The London Branch of the Purchasing Officers Association held a successful dinner-dance at the Connaught Rooms on Feb. 3, under the chairmanship of Mr. W. H. Napper (South Suburban Gas Company). The election of the Association's 1,000th member was celebrated, and in handing this member (Mr. F. C. T. Humberstone, of Hawker Aircraft, Ltd.) his diploma, Mr. W. Gildon (a Founder Member and Past-President) briefly reviewed the rapid progress the Association was now making.

The Committee of the Chemical Engineering Group has decided that the time has now come to revert to the pre-war practice of arranging an annual dinner on the occasion of the annual general meeting instead of holding a luncheon, as has been done during the past few years. Accordingly, the annual general meeting will be held, this year, at the Waldorf Hotel, London, on May 28, and will be followed by dinner, at which the guest of honour will be Marshal of the Royal Air Force the Rt. Hon. Lord Tedder, G.C.B., Chief of the Air Staff.

In a Letter to Billingham-on-Tees Urban District Council in regard to local gas supplies, Stockton Corporation Gas Department stated that the Minister of Fuel and Power had approved the laying of a 12 in. gas main and the contract had been let. The completion of the work was, however, dependent upon the supply of fittings, which unfortunately were in short supply. As soon as the Ministry's approval was secured, a contract would be let for a new storage holder at Haverton Hill. The Urban District Council has written to the Department on the question of gas charges.

Stourbridge Town Council on Feb. 24 approved a scheme for increasing and improving the plant of Stourbridge Gas-works at a cost of £340,000. The Cost Sub-committee regards the replacement of certain retorts as necessary, and it is suggested that new ones, with a capacity of 2,000,000 cu.ft. per day, be erected on land adjacent to the works, together with coal and coke handling plant at an estimated cost of £250,000. The Council considers that a high pressure gas distribution plant should be provided at the earliest opportunity in order that pressure in the area of supplies can be more equally distributed. The estimated cost will be £60,000. The scheme also includes the provision of a replacement condenser at £5,000, and a water gas plant at £25,000.

The Scottish Steel Industry is planning to raise its present annual output of 1,800,000 tons to 2,250,000 tons within the next 10 years. The ratio of increase is slightly higher than that planned south of the Border. Revealing these facts in Glasgow at a meeting of the Incorporated Sales Managers' Association, Lieut.-Col. Thomas R. Craig, a Director of Colvilles, Ltd., and its associated steel companies, remarked: "From Press and Parliamentary reports one would gain the impression that we in Scotland are lagging behind other districts in the development of the steel industry. Nothing is further from the actual position. We have stated to the responsible people that we are fully prepared to maintain our present ratio of output in Scotland compared with Britain as a whole, and we have undertaken to increase production by almost 500,000 tons." The British steel industry aimed this year at producing 13,250,000 tons, although that target was fixed before the fuel crisis arose. To allow for the growing demands for steel at home, and leave an adequate tonnage available for the direct export trade, the industry planned a 20% expansion, bringing the total up to 16,000,000 tons in the next seven to 10 years.

Scientific Films

In his Presidential Address to the Scientific Film Association on Feb. 8, Mr. Arthur Elton said that over 2,500 copies of the Association's catalogue of films of general scientific interest—the first of its kind in this country—had been distributed and sold, both here and all over the world, and a further 1,000 copies were being printed. The Association's activities and aims would continue to be directed along two main channels: the provision of a service to specialists—scientists, doctors, industrialists, &c.—on all matters relating to technical, instructional or research films; and "science for the citizen"—the popular presentation of science and scientific method through the medium of the public cinema. The latter aim had not, as yet, shown big results, but there were signs of a growing body of critical public opinion which when strong enough would help to stimulate the production, and repeated showing in cinemas, of good scientific films.

Closely allied to the latter problem was the international exchange of scientific films and the creation of international standards for their examination and critical appraisal. The draft constitution for an International or World Scientific Film Association had already been discussed with the counterpart organization in France.

This aspect of the Association's work was further dealt with by Mr. Basil Wright, the President for the coming year. A letter had been sent to Dr. Julian Huxley offering support to UNESCO and specifying ways in which the Association could be of practical help to that body in the carrying out of its programme relating to the mass media; this offer had been accepted.

Another Intensive Course

The Institution of Gas Engineers announces that arrangements have been made to commence an Intensive Course at the Westminster Technical College, London, in Gas Engineering (Supply) on April 14. The course is intended for students who have had little or no previous training in gas engineering, but it is assumed that applicants will already possess an elementary knowledge of mathematics and science. It is designed to enable them to reach the Ordinary Grade standard by December. A period of practical training with a gas undertaking will follow and a further full-time period at a technical college, commencing in April, 1948, will take the students to the Higher Grade standard by approximately December, 1948.

The portion of the course relating to the Ordinary Grade Certificate will run from April 14 to July 25 and from Sept. 8 to Dec. 19.

Arrangements will be made for those students who desire it for the whole or part of the summer vacation to be spent with a gas undertaking for practical training. After this portion of the course students will be required to pass examinations in ancillary subjects set by the College and in the main subject of Gas Engineering (Supply) set by the Board of Examiners of the Institution of Gas Engineers.

By arrangement with the Gas Light and Coke Company and the Westminster Technical College the practical and theoretical training in the main subject of Gas Engineering (Supply) will be undertaken at Watson House.

Road Tar Certification

The Certification Trade Mark for Road Tar, instituted by the British Road Tar Association over a year ago, has now been in operation for a full season. Licences to use the mark have been granted to a large number of road tar suppliers in all parts of Great Britain. By the establishment of the mark, the Association has taken another important step forward in carrying out its policy of continuing to strengthen the confidence of the users of road tar through its research and technical development work. The Association has for long recognized the value of scientific research, and the technique of road tar production and its use have been the subject of intensive investigation.

Certified road tar represents the peak of present technical achievement in supplying a tar of the highest quality. By its system of control, which includes the examination of plant and the testing of road tar, the Association is satisfied that all road tar supplied by those authorized to use the trade mark will conform to B.S. 76-1943. Furthermore, the Association's system of control has been approved by the British Standards Institution, with the result that sanction has been given to use the British Standard Mark. Thus, the quality of road tar is guaranteed as complying with B.S. 76-1943 by the Association and the British Standards Institution jointly, and all users are relieved of any anxiety on that point.

The significance of these facts is that they offer further evidence of the progress that has been made in meeting the requirements of modern road construction. The whole trend of the Association's development work has been to reinforce the importance of the scientific approach to roadmaking, to stimulate improvements, and to ensure the production of the best quality tar and its most efficient utilization for the construction and maintenance of roads. Meanwhile, the Certification Trade Mark for Road Tar will be of enhanced importance in the practical tasks of the country's reconstruction plans.

Ideal Home Exhibition

The *Daily Mail* Ideal Home Exhibition, opened by Queen Mary last week, was the 24th of these great events, and is proof of the ability of British industry and craftsmanship to recover from the dislocation of war to meet the needs of peace. It shows how present-day shortage of material can be overcome, and not the least interesting feature is the fact that nothing on show is "for export only," most of the goods being available for immediate purchase.

On the arch over the grand staircase can be seen the dedication: To the craftsmen of to-day—Inheritors of the traditions of yesterday.

Since pre-war days, lighting, heating, refrigeration, and other services have been revolutionized. The model pre-fabricated dwellings on view in the Village, with their up-to-date equipment, are intended to convince the public how attractive this type of house can be.

A visit to the Gas Pavilion in the Main Hall is an answer to the housewife's dream of kitchen equipment. The British Gas Council and the Society of British Gas Industries both have exhaustive displays of streamline cookers, neat gas pistols for ready ignition—and even one cooker with a permanent pilot jet operated by a tap, which instantly lights burners or grill—speedy water heaters, from the model which gives hot water all over the house to the small enamel cylinder giving instant boiling water in 50 seconds, examples of background heating, gas-heated towel rails serving a dual purpose for nursery or bathroom, and the latest gas washing-machine with agitator and wringer and accompanying drying cabinet, to dry and air the family wash within two hours.

Among the many small portable appliances to give added comfort to the home with small running costs are portable gas fires, gas toasters, light-weight ironing sets, all available for plugging into a gas point in any room as wanted.

Particularly effective exhibits are a Regulo cooker and an Electrolux gas refrigerator constructed of "Perspex" transparent plastic material, to show the best methods of packing these for economy and efficiency.

Also on the B.G.C. stand is a novel competition with entry forms giving a list of ten of the latest appliances on display. Competitors are invited to place these in what they consider to be order of usefulness in the home, stating reasons. Prizes are a gas cooker, a sink water-heater, and a gas fire.

Most remarkable among the stands are those of Ascot Gas Water Heaters and Bratt Colbran, Ltd. The former is erected on an island site with architectural montage and internal display designed by Douglas Dick, F.R.I.B.A. On the outside is shown a full range of instantaneous gas water heaters in their functional setting. On the front are Ascot multi-point installations and on the back a battery of Ascot boiling water heaters wired to the aluminium mesh.

The Bratt Colbran stand exhibits cast and rustless steel hearth type fires and Portcullis gas fires. The latest neat burner Lancelot fire is shown, and the same principle embodied in the latest Mortimer two-unit radiator.

Other stands of particular merit are those of Ewart & Son, Ltd., displaying their various types of instantaneous geyser and modern sink water heater, and the Ranalah Sales Corporation, Ltd., with examples of water heaters and airing cabinets.

The stand of the Solid Smokeless Fuels Federation shows examples of smokeless convector open fires and stoves, domestic and central heating boilers and modern smokeless fuel cookers, low in fuel consumption.

Among all the exhibits in the Gas Pavilion, stress is laid on the fact that they give the greatest possible fuel economy, of particular importance at the present time.

S.B.G.I. Golf

The S.B.G.I. Golfing Circle is continuing its pre-war practice of altering the date of its spring meeting to coincide with the meeting of the Institution of Gas Engineers. At this meeting, members of the Golfing Circle compete for the Thornton Cup, and members of the Institution are invited to compete for the Coronation Plate presented by the Golfing Circle some years ago.

The meeting will be held on June 2 on the course of the Moor Hall Golf Club, Birmingham, of which the President, Mr. George Pearson, is a member. Formal notice and invitations will be issued during May with the normal Institution communications.

CORRECTION

We regret that owing to the late delivery of a proof we were unable to correct a reference in the Wellington Tube Works, Ltd., advertisement appearing in our Feb. 12 issue. In the second paragraph "35,000 cu.ft. of room space" should have read "25,000 cu.ft."

Junior Associations' Activities

THE March issue of "GAS," delayed by the 14 days' ban on the printing of periodicals as a result of the fuel crisis, is due to appear to-day (Mar. 12). In order that non-Junior readers of the "JOURNAL" may know something of what the Junior Gas Associations are saying and doing we give below a brief outline of the principal contents.

Pointer to the Future

Mr. H. N. Dann's Paper, "1938-1944: A Pointer to the Future" to the Manchester and District Junior Gas Association, published in last month's issue of "GAS," provoked a discussion which was of no less value than the Paper itself. In fact, the Author, in his reply, admitted that he had prepared the Paper with the deliberate idea of provoking an illuminating and lively a discussion as possible. Among the points raised were a plea for a uniform method of the installation of gas services in new housing estates, the problem of getting new appliances in these days of universal shortage, sulphur removal, corrosion of appliances, and adequate training of installation and maintenance staffs.

Mechanical Aids to Mainlaying

"Mechanical Aids to Mainlaying" (as distinct from mechanical mainlaying) is the subject of a Paper by Mr. I. M. Anderson to the Scottish Junior Gas Association. If mainlaying is to be carried out principally through a city, mechanical devices can only be aids. The surest, safest, and in the long run the cheapest method of opening tracks is the well-tried pick and shovel method, but it is possible in nearly all cases to lighten the labour and speed up progress by using a variety of mechanical aids, which the Author proceeds to describe. These include lifting tackle, mobile compressors, pumps, pipe-cutting machines, a torque measuring spanner, and a pipe wrapping machine.

Tar and Benzole Distillation

A survey of the main processes used in the separation of crude tar and crude benzole into their useful products is given by Mr. R. Scott, of Midland Tar Distillers, Ltd., in his Paper on "Distillation of Tar and Benzole," to the Midland Junior Gas Association. The Paper is based mainly on the handling of vertical retort by-products, and the Author realizes that the behaviour of other types of crude materials or fractions may be very different. Adoption of continuous operation, improved fractionation, and better instrumentation have been outstanding features of recent developments. Work on the development of new processes and long-term studies of both crude tar and its products are being pursued. Every phase of the Industry is being studied with a view to effecting improvements in products or operation, and despite current difficulties steady progress is being made in many directions.

Gas Making at Kelty

A brief Paper by Mr. W. C. Hogg on "Gas Making at Kelty" to the Scottish Junior Gas Association reveals great concern as to how to cope with increasing gas demands. Having regard to the future gas supply in West Fife, and realizing that increasing outputs in the various gas-works must necessitate extension of plants in all these very soon, he suggests that it is desirable that some central plant should be erected to supply gas for all. With the coal mines nationalized and the Gas Industry nearly so, a large vertical retort plant erected at one of the adjoining collieries appears to the Author to hold such advantages as cheaper capital expenditure, better working results through the use of fresh wrought coal and up-to-date plant, cheaper costs of production, and the elimination of railway transport. Such a project is of interest to all the small and medium sized works, and the question of bulk supply will certainly be a consideration of the near future.

Consumer Service

The gas consumer in London, Portsmouth, or Timbuctoo should receive the best and most efficient service that is possible. What is deemed excellent in London must be of the same standard as obtains elsewhere. The Industry should determine what is the best possible standard, and all adhere to it. There is need for a greater pooling of knowledge and experience in the matter in order that the very best systems of operation can be determined, and then accepted as standard practice in all undertakings. This is not a political matter; it has nothing to do with nationalization; it is simply a question of ensuring that the gas consumer, no matter where situated, shall receive a common high standard of service from the Industry. In these words Mr. J. A. Marwick sums up his Paper on "Consumer Service: Deeds not Words" to the London and Southern District Junior Gas Association. Though there is much re-iteration of well-known argument, there is also a good deal of new material in a Paper that led to a very useful discussion.

Leakage from Distribution Systems

Mr. C. D. Shann, Assistant Distributing Engineer of the Gas Light and Coke Company, in his Paper on "Some Investigations on Leakage from Gas Distribution Systems" to the London and Southern District Junior Gas Association (a first instalment of which is published in the March issue) gives a comprehensive picture of London's vast system and a thrilling account of wartime experience. Distribution systems are designed to last for an indefinitely long time and the materials used in their construction must be selected with this in mind. Investigations to determine suitability of materials or policy regarding their installation and maintenance must therefore necessarily be protracted. Investigations to evaluate the distribution factors have yielded results which show their order of magnitude in the Company's total unaccounted-for, which is normally about 4% of the gas made. There is evidence that the distribution of dried gas tends to increase leakage from spigot and socket lead joints. Bending stresses due to subsoil loading are probably the primary cause of fractures in cast iron pipes. Contraction stress due to temperature change cannot be the sole cause of fracture, but when superimposed on a bending stress which is near the limiting strength of the pipe may be the final cause of fracture. Reduction of leakage may be effected in many ways, but Mr. Shann considers the most important of these to be: Testing for soundness before connexion to system; avoidance of conditions under which plant may be subjected to effect of ground subsidence; practical means for the rapid detection and location of leakage; fitting of leak clamps when remedying leaking spigot and socket joints in cast iron mains; use of flexible joints for new mains; elimination of cast pipes of less than 4 in. diameter; avoidance of conditions where a part only of a pipe is held rigidly; use of screwed or welded joints in steel pipes; and protection against corrosion.

Gas and Rate Relief

Framed with the object of showing the actual rates levied in various towns and the extent to which such rates have been increased or reduced by municipal undertakings and estates, the 62nd annual statement of "Rates Levied in Various Towns" (1946-47) is of more than usual interest in view of possible changes in the ownership of public utilities. Mr. W. Nicholl, Borough Treasurer of Preston, Lancs, continues the good work which he and his predecessors have done over many years in presenting in a mass of statistics an extremely interesting picture of municipal finance and a clear record of the profits and losses of gas and other undertakings and their effect on the rates.

Trends in gas prices in the municipalities are shown by a complete list of the charges per therm and per 1,000 cu.ft. within and outside the Borough or Urban District boundary, together with the declared calorific value.

From the total list of towns covered by the statement must be deducted the very high percentage served by gas companies. Of the remainder, many of the gas undertakings are so operated as to show neither a profit nor a charge on the rates, the profits being devoted to reductions in price or other concessions, and the losses by increases. Apart from these instances, however, it is shown that in the last financial year ratepayers in the aggregate benefited to the extent of £247,261, represented by a total rate relief from 24 undertakings of £248,862, less transfers in respect of deficiencies in two undertakings amounting to £1,601. The undertakings which afforded relief to the rates were:

Town	£	Town	£
Leeds	115,000	Spenborough	3,900
Bradford	25,000	Goole	3,000
Nottingham	19,068	St. Helens	3,000
Lincoln	15,000	Scunthorpe	3,000
Middlesbrough	10,000	Stourbridge	2,700
Salford	10,000	Tredegar	2,200
Oldbury	5,000	Colwyn Bay	2,000
Southport	5,000	Stafford	2,000
Tipton	5,000	Walsall	1,760
Stockport	4,881	Darwen	1,000
Widnes	4,612	Heywood	1,000
Oldham	4,000	Nelson	740

The two undertakings which incurred deficiencies and were, to that extent, a charge on the rates were:

Abercarn	£1,101	Swadlincote	£500

It is emphasized in an introductory note that the report is not intended to demonstrate the desirability or otherwise of municipal trading. It does, however, provide a basis for speculation as to what will be the effect on local rates if and when the Gas Industry passes into national ownership.

British Road Tar Association

THE British Road Tar Association held its 21st Anniversary Luncheon, the first function of its kind for eight years, at Grosvenor House, Park Lane, on Feb. 19. The President, Mr. H. E. G. West, was in the chair, and the principal guest was Mr. Alfred Barnes, Minister of Transport.

The PRESIDENT, proposing the toast of the guests, said it had never been more important to use to the best advantage in the service of this country a product which came from coal in the process of extracting gas, coke, motor spirit, and other by-products. For 16 years, through depression and disappointment, the Association had continued to "cast its pitch upon the creosotes," finding money for research in lean years as well as in the fat, and recently doubling the amount. They welcomed those veteran scientists, Dr. W. H. Glanville and Dr. A. R. Lee, who had at times been a little surprised to find that private enterprise could be so enthusiastic in support of research. They also welcomed the new Chairman of the Department of Scientific and Industrial Research.

The Chairman of their Managing Council, Mr. J. Davidson Pratt, had, by invitation of the Department, recently accepted the Chairmanship of the Departmental Road Tar Research Committee, on which the Association was well represented, and on which they were fortunate to enjoy the willing help of the technical officials of the Ministry of Transport, the Ministry of Fuel and Power, the Chemical Research Laboratory, and of well-known surveyors. Broadly the object of their researches was to find the most suitable types of tar for road work and the best means of using them. Thus, not only did they study the chemical and physical properties of tar, but they also studied the tar in relation to the stone used in road work in order to determine the best combination of gradings and tar properties to produce a durable, non-skid surface.

Practical Tests

Work in the laboratory had to be backed up and proved by practical trials on the road. While progress at times seemed slow they had had data to show that they could get, from modern tar, correctly used, even better results than had been obtained in the past. That tar had done a good job in the past was proved by the excellent condition of the tarred roads of the country, in spite of the impossibility of adequate maintenance during the past seven years, and the heavy military traffic many of them had to carry. A new device had been taken over from the inventor, one of their own members, in the form of a tar spraying indicator which ingeniously instructed those in charge of spraying regarding the temperatures, viscosities, spreading capacity, adhesion, and many other points which they should watch "all on a summer day."

Now that the Minister of Transport had accepted responsibility for the trunk roads and for advising the local authorities whom he grant-aided, he was sure he would be interested to know that the Association had provided, with the help of the British Standards Institution, a means of guaranteeing the quality of the tar which its members supplied. This was done by means of a certification trade mark which was given only if the Association was satisfied, by rigid inspections and tests by independent officials, that the particular tar distiller had the equipment and methods of control which would ensure that the resulting road tar would comply with the latest British Standard specification.

There were some buyers of road tar during the war who fancied that they had "skimmed the cream" in their search for war products, and he would give the most categorical assurance that the reverse was true. They had actually improved the properties of road tar during the war years. Bound up with the matter of guaranteed quality was their work in association with the British Standards Institution. He believed that the B.S.I. would one day be cited as a measure of the adaptability of the British people to world needs in changing times. This country was further advanced than many in matters of standardization. Who, for instance, would have expected years ago a British Standard specification for road tar or for macadam? He would commend to the sympathy of all present the urgent call which was to be put out shortly for support for the B.S.I.

Principles of Management

In the chemical industry they tended to concentrate on technical management to the exclusion of administrative training. Few of them dealt with large numbers of employees, as in other industries, but joint consultation in matters which affected employees was a right which was being claimed throughout industry; he emphasized right of consultation, and not of decision. Responsibility for decision must always remain with the management. Every man who had the authority to command and instruct, based on agreed policy, should be properly trained in the principles of management, and he had great hopes that the British Institute of Management, shortly to be formed, would provide opportunities of training for all who had that responsibility.

The British Road Tar Association had shown in 21 years of existence that groups of individuals, representing gas undertakings, coke oven installations, and tar distilleries, could work together for solid achievement through co-operation born of common sense. He thought they would be justified in expecting encouragement and help from the Minister of Transport above all others, remembering his own record as the main driving force and inspiration of a great co-operative movement. He hoped that some day it would be laid down as the policy of the Ministry that our indigenous product, British tar, should be given the precedence to which it was entitled for all tar macadam and tar spraying work grant-aided from national funds.

Mr. BARNES, responding to the toast, expressed appreciation of the work of the Association and referred to the wear and tear which the roads of this country had to undergo during the six years of war. Neither in design nor construction was it ever visualized that they would have to take the type or amount of traffic they had to bear. They had stood up remarkably well and everybody associated with the road industry was entitled to be proud of that fact. In the face of the shortage of labour and materials and the strained financial resources of the country, the Ministry of Transport had decided that its first task was to repair and maintain the existing road systems. During the past 12 months they had concentrated on catching up the arrears of maintenance before starting on a bigger programme of new construction.

Speaking as a road user, he felt there was incompatibility between different forms of transport, and there was a need for a single-purpose road—a motor road—on which they should avoid having a different type of surface every 200 or 300 yards. It was such variation in surface that created a psychological uncertainty in the mind of the driver and resulted in accidents which should be avoided.

Finally, Mr Barnes handed to the President a large 21st birthday key to mark the occasion. Mr. West passed the key on to Mr. J. Davidson Pratt, Chairman of the Managing Council.

Mr. A. W. SMITH informally proposed the toast of the President, to which Mr. WEST briefly responded.

Tribute to Mr. Robert Foot

Now that the full responsibility for the management of the coal industry has passed to the National Coal Board, Mr. Robert Foot has, by mutual arrangement between the Mining Association and himself, vacated the position of Chairman of the Association.

In announcing this on Feb. 13 the Earl of Crawford, President of the Association, recalled that it was in April, 1944, that Mr. Foot was appointed to fill the newly-created office of full-time Chairman (from outside the industry) of the Association, as part of the steps then considered necessary to enable the Association to deal with the issues confronting the industry.

His "Plan for Coal" was published in January, 1945; and, after acceptance by the industry, the Plan was on the point of being put into practical operation when the result of the General Election made the nationalization of the mines a certainty. From then until the following July Mr. Foot had devoted himself to the preparation and conduct of the colliery owners' case for fair compensation before the Tribunal presided over by the Master of the Rolls, who, at the conclusion of the hearing, had paid a high tribute to the way in which that case had been prepared and presented.

Since then he had remained Chairman of the Association for the purpose, among others, of assisting in implementing the promise given to Mr. Shinwell in September, 1945, and subsequently repeated to the National Coal Board, that the colliery owners, through the Mining Association, would facilitate the transfer of the mines to public ownership when the time came.

The Vesting Day had now passed, and Sir Arthur Street, the Deputy Chairman of the National Coal Board, had said recently in a public speech, that "things could not have gone so smoothly without the willing co-operation of the former owners," and that it was only right that he should take the opportunity "of saying a word of thanks to them, to the District Coalowners' Associations, and the Mining Association for the help they had given." They had "facilitated the change-over in every possible way."

Nobody, said Lord Crawford, who had been associated with Mr. Foot during the last three momentous years, would ever forget either his sincerity or his personality, or the quality and value of the work he had done for the industry—and would have done for the nation through the industry, had the course of events been different. He would leave them with their heartfelt good wishes, not only for his future personal success, but for that of his efforts to serve the country through the private enterprise in which he so profoundly believed.

Mr. Foot will be succeeded as Chairman of the Mining Association by Mr. W. A. Lee, C.B.E., who has been prominently connected with it for more than 25 years and who is at present Deputy Chairman.

Accident Prevention in the Training of Apprentices*

By R. N. LE FEVRE, A.M.I.Mech.E.
Training and Education Officer, Gas Light and Coke Company

THE craft of gas fitting is one in which a thorough knowledge of the principles of accident prevention is of paramount importance. How necessary this is is borne out by statistics. As our training activities have been intensified so have our accident figures been reduced until to-day the number of major accidents per annum has fallen almost to vanishing point.

Although training has been largely responsible for this, it is not by itself the sole remedy. Other factors which must be taken into account are:—

(a) Tool control.
(b) Specification and standardization of materials.
(c) Adequate and competent supervision.
(d) Sustained laboratory research on appliances, tools, methods and materials.

These factors are important since the well-trained man is at a serious disadvantage, in spite of his training, if his tools are of poor quality or in bad condition, or if he is compelled to work with materials of indifferent quality.

Every fitter employed by the Gas Light and Coke Company is issued with a complete kit of all tools necessary for his normal duties. In addition, a stock of special tools is maintained at each district depôt for use on work of an abnormal nature. Each of these tools—and there are, of course, many thousands of them—is designed by the Company and accepted only if the manufacturers abide by a rigid specification. A staff of Tool Inspectors is employed visiting the various depôts to ensure that tools are in good condition, to condemn and exchange tools which are not, and to see that only authorized tools are being used.

The same procedure is followed with regard to materials, fittings, and other equipment. Fitters are encouraged to discuss their problems with the Tool Inspectors and to offer suggestions for improved methods.

Precept and Practice

The major causes of accidents being thus removed, there remains the problem of ensuring that, of this large army of workmen, all carry out their duties in the manner in which they have been taught, since the greater part of a gas fitter's work is carried out on his own responsibility and without supervision.

It is one thing to train a man in safe methods of working and to issue him with the best tools and materials to do his work, but it is quite another matter to be certain that, away from his depôt and his foreman, he will conscientiously carry out his work according to his Rule Book.

Careful investigation of the few accidents which do occur indicate that in all instances the man responsible (so frequently himself the victim) has disregarded instructions by carrying out his work in an unorthodox manner.

At each District Office, a Service Supervisor, who is a competent technical officer, is assisted by a staff of foremen and assistant foremen. This staff is responsible for maintaining the closest contact with the fitters and, apart from seeing that all work is carried out in a safe and efficient manner, it accomplishes valuable work by following up the initial training with instruction on every possible occasion.

The Management of the Company is convinced of the importance of good foremanship in the chain of command and, from time to time, we conduct series of courses for all district foremen, with the object first of bringing them right up to date in all the technical aspects of their work, and secondly, with a view to impressing upon them the necessity for good foremanship in the widest sense of the word.

Taking all this into account, therefore, it will still be appreciated that the problem is, in essence, so to train the man from his boyhood as an apprentice that a conscientious spirit of reliability and care eventually becomes second nature to him, whether or not he is under the direct supervision of his foreman.

Apprentices and Safety First Methods

The young apprentice comes to us straight from school at the age of between 14 and 16 years. With few exceptions it is his first introduction to industrial conditions. Previously he has begun his school day at 9 a.m. and had only a few minutes' walk to school. Now he must start work at 8 a.m. and, possibly, cover an hour's journey beforehand. His first reaction is, quite naturally, one of physical and mental fatigue brought about by these unaccustomed conditions and surroundings. Against this, fortunately, we know that the lad is at a most impressionable and receptive age and the time is just ripe to influence his eager mind. From the first he is given lectures either solely devoted to accident prevention, or on subjects which must of necessity include certain safety principles. On the first morning he is told of the hazards in travelling to work particularly if he cycles. Before he is allowed to touch a tool he is given several lectures on the care to be exercised in handling it.

I am a firm believer in the value of visual demonstration in all forms of training, irrespective of the type of audience. With boys in particular more can be achieved in minutes by actual demonstration than by hours of lectures and note taking. In gas fitting practice there are a few very serious hazards which most uninitiated persons would not believe could happens unless they had actually witnessed them.

I attach considerable importance, therefore, to a series of carefully staged demonstrations of "accidents" which each apprentice must witness. There are many of them, but it will suffice to describe two.

As is well known, in order to bend steel or wrought iron pipe of the larger sizes, it is necessary to heat the part to be bent in a forge. This part is frequently at, or near, the extreme end of a 10 or 12 ft. length of pipe.

It is difficult to heat only the exact part required, so the fitter cools off the surplus by pouring cold water as required or by plunging the portion to be cooled into a tank or bucket of cold water. He also does this when he has bent the tube to expedite his further work with it. The red hot pipe causes a rapid local boiling of the water and steam is forced up the pipe and ejected with considerable violence from the other end. With a long length of pipe the nearby work-mate is usually the victim.

The safety precaution is simple. One hand is placed flat on the free, cold end of the tube. The steam merely compresses the air in the tube and the man's hand is in contact with this cold air.

The second example also refers to a common task of a gas fitter's work—working with molten lead or solder. If the ladle be damp and is plunged into molten metal, the rapid boiling of the water on the surface of the ladle causes the metal to be ejected with explosive-like violence. The operation is, of course, perfectly safe, if the user first makes certain that the ladle is thoroughly dry. A carefully protected instructor demonstrates the two methods.

Other points to which special attention is directed are:—
Never using a file without a handle.
Exchanging chisels, punches and similar tools immediately the tops split and before they become "cauliflowered."
Secure fixing of hammer heads.
Cleaning the teeth of gripping tools to avoid slipping, and other precautions against tools slipping.
Using the correct tool for the job.
Working with gas in confined spaces.
Prevention of sparking.
Care with adjacent electrical conduits and apparatus.
Working with methylated spirit, paraffin, paint solvents and other inflammable liquids.
Proper handling and use of steps and ladders.
Removing tools from step ladders before moving them.
Precautions with raised floor-boards, man-hole covers, etc.

* From a Paper to the South Eastern Group of the London Industrial Committee of the Royal Society for the Prevention of Accidents, Feb. 5.

Care in warning occupiers of premises of any hazards which might arise while work is in progress.

Special attention is directed to training in the resuscitation of gassed persons.

During the lectures and demonstrations on safety first methods, each apprentice makes a comprehensive series of notes which he retains for future reference.

During the first weeks of training the number of minor accidents among apprentices—very slight cuts and burns—is fairly high. These are made examples for training. Reports have to be made out properly and the cuts, &c., though sometimes negligible, must be properly dressed and examined and redressed daily at an inspection parade.

When men and boys are working with lead pipe, jointing compounds, paint, &c., it is most important to stress the need for them to take precautions with slight cuts and abrasions and to wash before meals and before leaving work. In all the workshops and in the training shops, proper first aid boxes are, of course, available. For the gas fitter who, as previously explained, spends most of his working time alone, we issue a small first aid dressing in a jaconet container, similar to the first field dressing which is issued to all ranks of His Majesty's Forces on active service. This dressing forms part of the normal tool kit issued to every man and should always be available while at work to enable prompt attention to be given to minor injuries.

Possibilities of Coal Economies on Gas-Works

STRENUOUS efforts have been made by the Liverpool Gas Company to adapt its plant to achieve coal economies, and at the same time increase output. The Company has in operation four manufacturing stations, namely, Wavertree, Athol Street, Garston, and Linacre. Modifications and additions have been made to the plant at the various works, in view of current conditions and the policy outlined by the Ministry.

Wavertree Works

The Wavertree Works has only horizontal retorts and until January, 1944, the whole of the make (2 million cu.ft. per day, C.V. 560) was boosted to the Garston Works, some five miles away, where it was diluted with blue water gas before being returned to Wavertree for distribution. In January, 1944, to provide a greater flexibility in operating the four works, and to make greater use of the existing storage, a step grate producer was installed for dilution purposes. Since then a second producer, together with cooling and washing plant has been added, and the output of the station has thus been increased to approximately 3 million cu.ft per day of gas at 450 B.Th.U., and the inter-works transfer of gas between Wavertree and Garston has been discontinued.

The Athol Street station produces 6 million cu.ft. of gas per day in continuous verticals, and distributes direct to the district. No alterations have as yet been made at this works.

The carbonizing plant at Linacre consists of horizontal and continuous vertical retorts having outputs of 4¼ and 6 million cu.ft. per day respectively, the horizontal gas being of high calorific value (560) and the vertical gas of low calorific value (430). The water gas plants consist of two modern, completely automatic, Humphreys & Glasgow sets, each having a rated output of 4¼ million cu.ft. per day at a calorific value of 500. In January, 1944, a step grate producer, together with the necessary cooling and washing plant, was installed, and it was found possible to increase the output of the station by ¾ million cu.ft. per day without any alteration to the water gas plant. By making low calorific value gas in the verticals the volumetric output from the works has been increased, the necessary adjustments to calorific value being made on the water gas plant.

Garston Works

The carbonizing plant at the Garston Works consists of horizontal and continuous vertical retorts, having outputs of 2½ and 4¼ million cu.ft. per day, respectively. The three water gas units are completely automatic machines by Humphreys & Glasgow, two sets being designed each to give an output of 2.675 million cu.ft. per day and the third 3 million cu.ft. per day when making 500 C.V. gas.

In 1944 a supply of producer gas was taken from the producers feeding the verticals and it was found possible to augment the volumetric output of the works by this means. This practice had to be discontinued due to alterations in plant and a mechanical producer was installed and put to work in the spring of 1946: it was found possible to add up to 1 million cu.ft. per day of producer gas, which diluted the horizontal gas to a calorific value slightly below the declared valued of 450 B.Th.U. Alterations in the cycle on the water gas plant enabled this calorific value to be adjusted and controlled by making gas up to 530 B.Th.U. per cu.ft. The producer had a rated capacity of 2½ million cu.ft. per day.

Since the autumn of 1946 the method proposed by the Gas Light and Coke Company and Humphreys & Glasgow had been used to make gas of over 600 B.Th.U. per cu.ft. in water gas plants without any reduction in volumetric output. As a direct consequence the amount of producer gas which can now be added has been considerably increased. This has enabled the Company to stand off the coal gas plant at other works, and thereby to make a very considerable saving in coal.

Table I shows the variation in thermal output of the undertaking since 1939, together with the quantities of coal and oil used each year.

It will be seen that although the output of the Company has increased 27% since 1942, the amount of coal carbonized has only risen by 1½%. The ratio of "R" therms of gas made to tons of coal carbonized shows the effect of the alterations in methods of manufacture made to comply with the policies of the Ministry.

TABLE I

Year	Coal (carbonized) tons	Gas delivered million cu.ft.	Therms made made benzole extraction	Gas oil used C.W.G. gall.	R-therms made per ton coal carbonized
1939	356,460	7,416	36,584,619	2,510,147	102.63
1940	368,770	7,220	35,743,313	2,244,961	96.93
1941	372,565	7,440	36,118,698	2,420,253	96.95
1942	399,902	7,930	37,346,204	1,845,392	93.39
1943	399,818	8,244	38,605,893	2,138,660	96.56
1944	368,840	8,892	41,232,655	4,685,487	111.79
1945	397,686	9,351	43,059,716	4,748,975	108.28
1946	405,524	10,294	47,043,904	6,675,321	116.01

Economies in Coal Consumption

Table II shows the annual savings in coal made since 1943 by the modifications in policy dictated by the shortages of coal.

TABLE II

Year	Coal carbonized actual	Coal used if 1943 methods has been used	Saving in coal since 1943
1943	399,818	399,818	—
1944	368,840	427,016	58,176
1945	397,686	445,937	48,251
1946	405,524	487,198	81,674
			188,101

It will be seen that in the last three years the undertaking has saved over 188,000 tons of coal. At the present time the consumption of coal is reduced to an even greater extent (Table III).

TABLE III

COAL USED

Period, 1946	Actual	1943 methods	Saving	Per day	Therms made	R-therms made tons of coal
5 weeks to June 22	35,858	38,208	2,350	67	3,689.356	102.888
4 weeks to July 20	26,795	30,900	4,105	147	2,983,711	111.353
4 weeks to Aug. 17	24,347	29,822	5,475	195	2,879,581	118.273
5 weeks to Sept. 21	32,593	40,457	7,864	225	3,906,573	119.859
4 weeks to Oct. 19	26,136	35,945	9,809	350	3,470,807	132.798
4 weeks to Nov. 16	28,733	40,282	11,549	412	3,889,635	135.372
5 weeks to Dec. 21	40,713	55,189	14,476	413	5,329,042	130.893

This improvement is due in a large measure to the production of high grade gas in carburetted water gas plants which is diluted with producer gas having a calorific value of 120.

The mechanical producer installed at Garston has played a major part in the economies achieved; it has not only enabled considerable savings in coal to be attained, but has contributed materially to the increase in the capacity of the plant. This unit has been considered so successful that a similar installation has been made at the Linacre Works. A machine was brought from the Ministry of Supply in September, and was dismantled, re-erected (all in a period of nine weeks) and commenced operation in January this year. It is anticipated that even further economies will be attained during this year with this additional unit in operation.

Production of C.W.G. of High Calorific Value

The mechanical producer gas plant was supplied by the Power Gas Corporation and incorporates the Koller revolving grate, automatic continuous ash discharge and is fitted with gravity fuel feed allowing for practically continuous feed arrangement. A Lymn static washer is provided for cooling and washing the gas and a centrifugal gas cleaner and dry scrubber complete the cleaning of the gas. The producer gas is measured by an Electroflo flow recorder before being admitted to the coal gas stream. The output is 2½ million cu.ft. per day at 120 C.V. using graded coke as fuel.

Initially the C.V. of the carburetted water gas was increased as far as practicable by alterations to the operating cycle only. No diffi-

culties were experienced in making gas of C.V. up to 530 B.Th.U. per cu.ft., the extra heat required for cracking being obtained by increasing the blow period of 43-44%. At the same time the steam supplied on the back run was increased to 40% with the object of equalizing conditions in the carburetter and superheater, improving conditions in the fire, and the quality of the B.W.G. A calorific value of C.W.G. greater than 530 B.Th.U. was not practicable owing to limitations of the oil pumps.

The amount of heat necessary to crack a gallon of oil is comparatively small, being about 0.1 therm per gall.: thus the additional heat requirements will not be much greater than 0.1 therm per 1,000 cu.ft. of water gas made compared with normal practice, and will be supplied by 30 cu.ft. of blue gas. Assuming a 40% steam decomposition during the blow the amount of steam required would be 8 lb. per min. In fact 10 lb. per min. was added, *i.e.*, 1.1 lb. per 1,000 cu.ft. of C.W.G. made.

It having been decided that higher qualities still could be used with advantage, new oil pumps and delivery lines were installed. While this was in progress, it was felt that the simplest way of providing extra heat in the carburetter to crack 3-4 gall. per 1,000 cu.ft. was to enrich the blow gases with water gas by injecting steam into the air blast during the blow.

Methods suggested were:

(1) To insert a 1½ in. pipe from the L.P. steam supply to the plant and tap into the blast tee, leaving the steam on during the whole of the cycle. The disadvantage of this method was that the steam supplied during the backrun would be wasted.

(2) To proceed as (1) above but to insert in the line a valve operated by the generator blast valve ram so that steam was only supplied during the blow. This required a good deal of complicated fitting work, and it was felt that there was already sufficient complicated pipework under the operating floor. It was decided that the simplest method, and one which obviated the above disadvantages was to insert the steam supply connexion into the distance piece between the steam working valve and the backrun change-over valve on Nos. 1 and 2 sets

In No. 3 set, the orifice is omitted, and the steam discharge is determined by the nozzle formed by a 1½ in. by 1 in. reducing socket.

The advantage of adopting these methods lies in the fact that, though steam continually by-passes the working valves, it is diverted at the proper time to uprun, backrun, or blow, and, furthermore, is measured during the run by taking it at the outlet main steam meter. The rate of discharge, however, is too low to be measured by the meter when the main steam is shut off during the blow. Although upstream and downstream tappings for the orifice meter were made made into the 1½ in. line, it was found that a pressure gauge on the upstream tapping would give sufficiently accurate rates of flow for the purpose.

When the new oil pumps were installed and initial difficulties overcome, it was found that Nos. 1 and 2 sets would pass 20-24 gall per cycle (dependent on steam pressure), representing some 3.3 to 4 gall. per 1,000 cu.ft., while No. 3 set maximum was about 18 gall. (about 2.6 gall. per 1,000). The limitation on No. 3 set appears to be due to the longer length of 1 in. pipe between the 1 in. oil valve and spray, and this is now being modified.

Results of Short Period Test

It has not been possible to have a prolonged test run on the sets while making the highest possible C.V. due chiefly to limitations in the quantity of diluent producer gas available when working 2 or 3 sets and the gas demand has been such that one set working has been inadequate. A test with two sets was, however, made on Nos. 1 and 2 sets, when a remarkably constant C.V. averaging 604 B.Th.U. per cu.ft. was made during a period of 33 hours. The cracking efficiency during the test, though naturally lower, only falls from an average of 1.19 therms per gall. to 1.13, a reduction of only 5%. It is felt that still higher qualities will be made when modifications to oil lines are completed.

C.W.G. Plant—Garston Works

Machines at works	2
Duration of test	33 hours
Gas made	7,006,000 cu.ft.
Calorific value of gas	604 B.Th.U. per cu.ft.
Output therms per set per hour	641
Rated output at 500 C.V. therms/set/hr.	557
Increase in thermal output	11.5%
Oil used per 1,000 cu.ft. of gas made	3.59 gall.
Steam used per 1,000 cu.ft. of gas made	45.5 lb.
Steam used on blow	1.1 lb.
Air/steam ratio	43.1 lb.
Air used	13,555,000 cu.ft.
Coke used (estimated from number of charges to generator)	197,800 lb.
Therms per 1,000 lb. of coke	70.1
Therms per gallon of oil	1.13

Analysis of Gas Made (after Purification)

CO_2	4.8	H_2	35.3	CH_4	
O_2	0.6	CO	26.0		10.9
CnHm	11.5	C_2H_6	2.0	N_2	8.9
		Specific gravity	0.665		

Plant Cycle

Time Secs.		Time Secs.	
0	Stack opens	123	Oil off
3	Secondary Air on	144	U.R. steam off
80	Secondary Air off		B.R. steam on
		185	B.R. steam off
			U.R. steam on
83	Blast off Steam on	196	U.R. steam off Blast on
85	Stack shuts	202	Stack opens

Blow	44%
Up run	35.6%
Back run	20.3%
	99.9%

86 Oil on

Plant Conditions

S.H. base temperature	1,430° F. max. gen. base 700° F.
Carb. base temperature	1,420° F. to 1,200° F.
Blast pressure	20 in. W.G.
W.H.B. pressure	105 lb. per sq. in.

Results of Plant Operation

Week ending, 1946	Gas Made 10^3 cu.ft.	C.V.	Thms.	Oil 1,000 gall.	Coke 1,000 lb.	Thms./ gall. oil	CO^2	Total inerts	% B.R. steam	Thms. cycle	Air/ steam ratio
18.9	32,775	472	154,654	2.17	34.7	1.21	6.6	20.2	39.3	27.0	37.0
20.10	31,608	529	167,120	2.64	32.3	1.18	5.7	15.1	40.3	30.7	40.4
15.12	39,257	554	217,576	2.96	29.1	1.19	4.5	16.8	40.9	33.6	47.5
1947											
26.1	36,925	545	201,339	2.83	32.1	1.20	5.4	17.0	37.6	36.7	45.5

Some difficulty has been experienced in leakage of gas from the superheater stack valve, due to high back pressures set up by the high rates of oil gas production during the oil injection period, and there is some reason to believe that a practical limit is being reached to the total output of gas from the sets due to limitations in the size of the connexions between outlet washer and inlet relief holder.

Although the temperature of the top checkerwork of the carburetter is very low at the end of the run, little difficulty has been experienced in lighting the enriched blow gas, even though the carburetter blast valve is opened 2 secs. after the generator blast valve. This, of course, effects a considerable saving in potential heat of blow gases which might otherwise be blown to stack.

It is necessary to reduce the steaming rates during the run, for the transfer of heat from generator to carburetter means a reduction in the heat available for B.W.G. manufacture and, for this reason, the volume of gas per cycle is little more than when making 450 B.Th.U gas though the quantity of oil gas is increased by 60-80%.

It is difficult to see how the large temperature fluctuations in carburetter checkerwork (200° F. or more) can be avoided. Some heat can be returned from the superheater during the backrun but this is limited by the purge time necessary at high rates of oil admission, and by grate temperatures, a practical limit probably being reached at 41-42% B.R. steam.

Effluents have not so far presented any serious difficulties. Considerably increased quantities of emulsion and oil tar have been pumped from the syphons, but it is felt that these can be handled at present. If the sets are run continuously at extra high oil rates, it is thought that some difficulties may arise in pumping syphons and in disposing of the tar.

The increased use of oil and producer gas, together with reduced amounts of coal gas, has caused an increase in the gravity of the gas.

At Liverpool the gas distributing system has recently been modified so that much of the gas is now distributed at intermediate high pressures, and it has been found that the increased gravity has not prevented the maintenance of satisfactory pressures at the consumers' meters.

Recently a statistical survey was made of all complaints from consumers over a period and no evidence was found that the gradual alterations in methods of gas manufacture had caused any increase in the number of complaints about inadequate supplies. It is therefore felt that under emergency conditions adequate supplies of gas of correct calorific value and purity at satisfactory pressure at the consumers' meters are the most vital points to be observed. Moreover, the policy pursued by the Company has been amply justified, for in 1939 the total gas capacity of the plant at all works was considered to be a maximum of 35 million cu.ft. per day, but on Jan. 30 the amount of gas distributed was 43 million cu.ft.

Bonnyrigg Town Council has decided to incorporate district heating in its latest housing scheme. The Department of Health has approved of the scheme, which will provide hot water and central heating for 182 houses of the cottage type. Including boilers, piping, and other installations for the heating system, the total cost of the scheme will be in the region of £225,000. The charge for the heating services will be about 7s. per week to each householder.

COMPANY MEETINGS

Cambridge Gas Company

The Ordinary General Meeting of the Cambridge University and Town Gas Light Company was held at Cambridge on Feb. 28, Mr. J. F. Cameron, Chairman, presiding.

The Chairman, in moving the adoption of the Report and Accounts, said: New records on an hourly, daily, and annual basis, were achieved in 1946. Those records have since been exceeded by nearly 20% on a day in January when the output was 6¾ million cu.ft., and indeed the average daily output for January exceeded the previous daily record by over 10%.

Increases in wages and in the cost of materials have seriously affected our expenditure. The awards of the National Joint Industrial Council for the Gas Industry have been greater than usual because in addition to increases in the cost of living bonus awarded to manual workers, certain other changes have been made on a national basis. There can be little doubt that these reforms to raise the status of the manual workers are desirable. They have, however, to be paid for.

The greater availability of labour and of certain materials has enabled us to take steps to overtake arrears of maintenance of plant and equipment at the works and on the district which accrued during the war years. These factors have combined to reduce the balance to be carried from revenue to profit and loss below what it has been in recent years and their effect has not yet reached its maximum. It will be still greater in 1947. As a consequence, your Directors regretfully felt it necessary to apply to the Ministry of Fuel and Power for authority to increase the price of gas by a further 1.2d. per therm from the beginning of the current year in order to meet these increasing costs.

A Year of Many Problems

The year under review has brought many problems. The increase in the number of our consumers by 408 in the course of the year, our recent experience of the height to which consumption can rise and the probability that solid fuel for domestic use will be in short supply for many years to come combine to raise the question of an extension of gas making plant as an urgent matter.

Coal stocks have been unpleasantly low during most of the year compared with pre-war standards and in May we had less than one week's supply in stock. In the latter months of the year, the allocation of coal made to us by the Ministry of Fuel and Power—never large enough to keep all our coal gas production plant in action—was still further reduced. Even so, supplies were uncertain and irregular owing to last minute diversion of our supplies to undertakings who were in worse plight than ourselves. The quality of coal delivered has also further deteriorated during the year. During the war the Government impressed on all gas undertakings the national importance of benzole and we then extracted the maximum quantity though this required additional fuel to maintain our calorific value. Now the scene has changed and it is an interesting example of the flexibility of the gas making process that the extraction of benzole has ceased.

Now to meet the national shortage of coal, the Ministry of Fuel and Power has urged all gas undertakings to manufacture the maximum quantity of carburetted water gas and the Ministry has again subsidized the cost of gas oil used in this process. That this Company has faithfully implemented the Ministry's request is proved by the fact that water gas made in separate plant constituted 43.5% of the total gas produced in 1946. To do this, it was again necessary not only to curtail our local sales of coke to a figure well below the pre-war level, thus sacrificing revenue, but to purchase some 4,000 tons of coke from outside sources. In December the shortage of rail transport caused the abrupt cessation of deliveries without warning, and our reserve stock of this fuel dwindled at an alarming rate to a precariously low level. It was with the utmost difficulty that we were able to obtain a restoration of supplies, and, our position became so serious that drastic restriction of supplies to all except essential customers was necessary for a short period. This was a step which we were never compelled to take during the war years.

Maintenance of Plant

In general, the condition of the Company's plant and buildings has been satisfactorily maintained. The most important unit of new plant installed during the year was a steam driven compressor capable of pumping 300,000 cu.ft. of gas per hour through our high pressure distributing system at pressures up to 10 lb. per sq. in.

During the year, orders for gas appliances and fittings were booked by our consumers to the value of £54,754, more than the combined totals for 1938 and 1939. But of this amount about £10,000 represents orders which could not be executed in the year for lack of appliances and material. One large and interesting contract which was completed has been the re-equipment of King's College kitchens.

In accordance with the Ministerial recommendation the choice of a medium for cooking in new permanent houses erected by the borough has been left to the tenants. As a result, 51 of the first 69 houses at Trumpington housing estate handed over to the tenants are equipped with gas cookers, and of the remaining 18, four have been supplied with some gas equipment. Wash coppers, gas-ignited coke fires, and other appliances have also been installed in these houses.

We have been able to resume mainlaying on a large scale and during the year almost six miles were laid. This compares with just over three miles in 1939 and six miles in 1938. The mainlaying work executed included, in addition to those to new housing estates, a 6 in. high pressure feeder main to Fulbourn Village and an 18 in. and 14 in. low pressure feeder main from the works along Newmarket Road to the corner of Ditton Lane. The completion of the latter scheme provides an ample reserve of capacity to meet the requirements of the large housing estate shortly to be commenced in the area adjacent to Newmarket Road and the Ring Road.

The Nationalization Position

Nationalization of the Gas Industry is a subject which still occupies a position very much in the forefront of the minds of Directors, shareholders, and the leaders of the Industry. We know now that we are presumably next on the list of the industries to be nationalized but that this is unlikely to be effected before the beginning of 1949. Of the form which it will take we have little definite information, although the legislation relating to coal and electricity may be a guide. The position is, however, a little clearer than when I spoke to you a year ago, for apparently the Government does not intend entirely to restrict necessary development during the intervening period. An assurance has been given that undertakings will suffer neither gain nor loss by incurring during that period capital expenditure on development schemes approved by the Ministry. The Ministry will also approve extension of undertakings' existing powers to raise fresh capital.

The Report and Accounts were adopted, Mr. F. J. Dykes seconding the Chairman's proposition.

Messrs. F. J. Dykes and H. T. Wing were re-elected Directors, and Mr. W. R. Elworthy was re-appointed Auditor.

Mr. Elworthy, returning thanks, mentioned that he had been Auditor for 28 years.

A vote of thanks to the Chairman, Directors and staff was proposed by Mr. W. H. Kester and seconded by Mr. B. Moore.

Portsmouth and Gosport Gas Company

The Annual Ordinary General Meeting of the Portsmouth and Gosport Gas Company was held at Portsmouth on Feb. 21, Alderman F. Beddow (the Chairman) presiding.

The Chairman, in moving the adoption of the Report and Accounts, said nearly £80,000 has been spent during the year on various extensions, including the enlargement of the capacity of the gas-making plant, the addition of a further lift to the Emsworth holder, the commencement of work upon a new holder at Fareham, and increasing work in the mainlaying department, due to the development of housing sites in the outlying areas. Depreciation provisions of approximately £20,000 had been made on the usual basis so that there was a net increase in the capital account of some £60,000.

Receipts from the sale of gas amounted to £928,511—a record figure. The proceeds from the rental of meters, stoves and fittings totalled £81,850, and the sales of residuals had exceeded £291,000. The total income of the Company amounted to £1,308,000, as compared with £1,162,000 last year, which was a very fine increase indeed, while the charge for gas had remained constant. The cost of coal and oil had risen to £581,000—an increase of £61,000.

The amount spent on repairs and maintenance of works and plant was nearly £188,000, compared with £153,000 in 1945, which itself was a heavy figure. Some £23,000 had been properly charged to the renewals fund and deferred repairs account, in which had been set aside some £85,000 in the past. There was still a balance of over £60,000, which it was expected would be devoted to similar expenditure in 1947 and 1948.

During the year the Company had entered into an agreement with the Petersfield and Selsey Gas Company for a bulk supply of gas to the adjoining Petersfield area of the undertaking, and it was hoped that the connecting main would be completed and a supply afforded before the end of 1947.

The Company were never unmindful of the industry and loyalty of the whole of their employees, all of whom had again given of their best in this difficult transitional period.

He formally moved: "That dividends at the rate of 4% on the 4% Preference stock, of 5% on the 5% Preference stock, of 5% on the 5% Maximum stock, and of 7½% on the Consolidated stock, all less income tax, be declared for the year ended Dec. 31, 1946, and that such dividends, after deduction of the interim payments made on Sept. 2 last, be paid on Mar. 1 to the stockholders as registered at the closing of the transfer books relating to such stocks on Feb. 8."

Mr. W. H. Bennett seconded, and the meeting agreed.

Southampton Gaslight and Coke Company

The Annual Meeting of the Southampton Gaslight and Coke Company was held at the Company's offices, Southampton, on Feb. 25, Brigadier E. M. Jack (the Chairman) presiding.

The Chairman, in moving the adoption of the Report and Accounts, said that capital expenditure incurred during the year was higher than in any year since 1931, when the first installation of the intermittent vertical chamber oven plant was erected. The extension of the static vertical retort plant accounted for the greater part of the expenditure. It was hoped to have brought this plant into use by the autumn of 1946, but owing to the shortage of labour and materials the work had been unduly delayed. It was, however, anticipated that the new plant would be ready for gas making before the end of April. There had also been considerable expenditure on new mains and meters due to the many housing schemes now in hand.

Production Figures

The increased production of gas for the year over that for 1945 was 264,000,000 cu.ft. or 9.3%. Compared with the last pre-war year, namely, 1938, the increase was nearly 700,000,000 cu.ft. or 30%. To cope with this increasing demand considerable extensions of plant were necessary. Orders had been placed for new purifiers and for a new carburetted water gas plant, but owing to labour and supply difficulties some time must elapse before their completion. These and other extensions on the works would absorb some £200,000 during the next few years and it would therefore be necessary to realize the greater part of the investments in Government securities which the Company was able to make during the war years.

Since the last meeting they had welcomed 109 men and women on their return from the Forces. They were glad to have them back and were appreciative of all they had done. He was particularly pleased to report that Staff Sergeant Ruddock, R.A., was awarded the British Empire Medal, and that Petty Officer Gorbell, Acting Petty Officer G. Andrews, and Sapper N. L. Pitcher had recently been mentioned in dispatches for their services. During the year a larger number of employees than usual (35 in all) retired on pension. Many of these men were well over the normal retiring age, but had elected to remain at work until their labour problems became less acute. They greatly appreciated this valuable assistance and wished them well in their retirement.

The distribution and fittings departments had been very busily engaged in laying mains and services to new houses and the fixing of the necessary appliances, and, since the shortage of labour and materials was particularly severe in these departments, it was pleasing to know that on no occasion had the progress of the housing authorities been delayed by their work. As regards the temporary houses, two-thirds of those in Southampton and all those in Eastleigh and the New Forest district were being fitted with gas cookers, washboilers and refrigerators, while he was glad to report that gas would be available to the tenants of all permanent houses in the area.

The supply of gas appliances of all kinds was unfortunately still very much less than the demand, and great difficulty was experienced in obtaining replacements, such as cooker burners, as well as tubing and fittings.

He thought it would be agreed that the results, as shown in the Accounts, might in all the circumstances be considered satisfactory. The outstanding features of the year had been (*a*) the serious and increasing shortage of coal ; (*b*) the difficulties of obtaining new plant and materials of all kinds; (*c*) increased costs; and (*d*) a demand for gas considerably greater (especially during " cold spells ") that in the record year of 1945. The fact that they got through the year without any curtailment of supply was a great tribute to the work of the technical staff and all employees.

Nationalization

Although he had very little information on the subject, his remarks would be incomplete without some reference to the proposed nationalisation of the Industry. An overwhelming majority of the undertakings had voted against the principle of nationalization, but at the same time has authorized the British Gas Council, if the Government adhered to the policy of nationalization, to co-operate with the Ministry of Fuel and Power in the details of its implementation. Such co-operation was, of course, understood to be without prejudice to their opposition to the principle. Although the proposed Gas Bill was not included in the King's Speech, preliminary consultations had been held. At this stage, therefore, he could only assure them that the Directors would continue to do all in their power to safeguard the interests of stockholders, consumers, and employees. He would mention that their Ordinary stock, which stood to-day at about 109%, would probably, in the opinion of competent judges, be worth more like 140% if it were not for the threat of nationalization.

The Report and Accounts were adopted, and Messrs. Burnett, Swayne & Co. were re-elected Auditors. A vote of thanks was accorded to the officers and employees, and a special vote of thanks was accorded to the Directors.

Wandsworth and District Gas Company

The Annual Ordinary General Meeting of the Wandsworth and District Gas Company was held on Mar. 4 at Fairfield Street, Wandsworth. Mr. Frank H. Jones, M.Inst.C.E., Chairman and Managing Director, presided.

The Chairman, in the course of his statement, said: Once again I am able to report that the sale of gas has broken all records. Our sale in 1946 exceeded that of 1945 by 12.9%, and the increase over 1938 amounts to no less than 22.7%. Unfortunately, these figures are not, in themselves, indicative of the true position, for the reason that some six years of war have taken their toll of plant and machinery, with the result that the efficiency of gas manufacturing plant has decreased, and thus greater expense is incurred in obtaining a higher output of gas from plant that has not had the attention it would have received under normal conditions.

In the early part of 1946, and again in the latter part of that year, the Company was compelled to curtail the supply of gas to its consumers due to the fact that we could not meet the demand. Unfortunately, far more serious cuts in pressures had to be made in the early part of 1947.

Last year I made reference to the somewhat nebulous and uncertain state of the Industry due to the prospects of nationalization. Beyond the fact that nationalization appears to be nearer, I do not feel that the position is such that I am able to give any clear indication of the future of your Company, other than to say that it is our duty to continue to supply our consumers with gas and to see that there is sufficient plant of the right type to meet the increased demands in the future—whatever that future administration may be.

High Costs

The revenue account discloses a record high cost of manufacture, all the charges showing an increase. So far as wages are concerned, a national award during the year added a substantial extra burden to the Company's finances, and in addition, the shift workers' conditions of employment were altered so that they now work six shifts instead of seven, but receive almost the same pay as they did for the longer working hours.

Repairs and maintenance of plant, however, show the greatest advance, this being caused by two major reasons, the one being the execution of repairs which should have been carried out during war years, and the other the much higher cost of labour and materials. As regards distribution of gas, here again the same general trend of rising prices and wages is disclosed, and the total which is shown in the accounts would have been much greater but for the lower allocation for depreciation of meters and stoves. Other sections in the accounts show the same tendency for costs to rise, and after taking credit for the additional revenue resulting from the record sale of gas, and for slightly better prices in respect of some of the residuals, the profit for the year is materially less than it was in 1945. The Company's manufacturing plant is as modern and well maintained as the war years and present lack of materials permit it to be, nevertheless our manufacturing capacity is severely strained.

Two years ago, your Board, visualising the position that was likely to arise, placed an order for a 4 million cu.ft. per diem carburetted water gas plant—delivery of this plant was promised for November, 1946. Despite the highest priority granted to the Company by the Ministry of Fuel and Power, this plant is still not completed, and so far as can be seen, is not likely to be available for gas-making for several months yet.

The Consumer Position

At the end of 1946, the number of consumers recorded was 215,612, showing an increase of over 5,000 during the year. This increase has, of course, brought about a corresponding demand for service and equipment; for instance, 106,000 orders of various types have been received, against 77,750 in 1945. Although more of these are outstanding than would obtain before the war, the position is in hand, and, as the supply position for such equipment improves, the staff returned from H.M. Forces will enable installation work to be accelerated and kept abreast with the demand.

In the industrial department, the dropping off in sales of gas for industrial purposes due to the termination of the war has ceased, and the demand has been stabilized at a much higher figure than we anticipated. The potential demand in the Industrial Field is very large and your Board has every reason to anticipate that substantial and valuable business will be obtained for the Company. There is a heavy demand for large-scale heating installations, which cannot be met for the reason that—once again—appliances and materials are not coming forward.

Two new colliers have been added to the Company's fleet, which now numbers six. The newest collier, the *Mitcham*, is the largest up-river collier and the first to be propelled by diesel machinery. During the year a record tonnage of coal was delivered at the Wandsworth station, namely 560,000. The discharging jetty, which was put to work in July, 1934, has now handled almost 5 million tons of coal.

The Report was adopted.

South Metropolitan Gas Company

The Ordinary General Meeting of the South Metropolitan Gas Company was held at the Livesey Institute, Old Kent Road, on Feb. 26, Mr. Frank H. Jones, M.Inst.C.E., the President, being in the chair.

The President, in the course of his statement which had been circulated with the Report and Accounts, said: The accounts show that the recovery which began in the second half of 1945 has been well maintained and that the financial strength of the Company has been unimpaired by the severe trial through which it passed during the war.

After meeting all prior charges and providing for taxation and making other appropriate reserves, the balance of profit, including £4,701 brought in from 1945, is £280,292, compared with £189,973 for 1945. This enables the Directors to recommend that for the past year the full basic dividend of 5% be declared on the Ordinary stock, leaving £39,588 to be carried forward into 1947.

Capital account shows a net increase of £130,431 in the fixed and long term assets, which is explained by the addition of another new vessel to the Company's fleet and by the manufacture and purchase of meters for the supply of gas to new consumers. Concurrently with this increase provision has been made for the depreciation and amortisation of these and other long term assets, including appliances supplied on rental.

Prices of Materials

Increases of expenditure under the heading of "Distribution of Gas" are due partly to increases in rates of wages and partly to increased business. There is, however, a third element in the increase in the costs of both manufacture and distribution, and that is the substantial advances which have taken effect during the year in the prices of commodities. With these increases, coupled with substantial increases in the rates of salaries and wages equivalent to some £150,000 a year, we had no alternative but to apply to the Minister of Fuel and Power on Sept. 19 for an increase of price. At length, on Nov. 6, authority for an increase of ¼d. a therm was granted. Very little benefit from this permit could, of course, accrue to us in 1946.

Revenue from the sale of gas at £4,208,109 is greater by £722,493 than the revenue of 1945, and the rents of appliances at £403,924 greater by £52,406. Sales of gas at 77,486,841 therms were greater by 24.66% than the sales of 1945 and, indeed, slightly greater than those for 1938.

Nationalization

The recovery and progress of the past year have been most encouraging, and you would be entitled to hope that the years ahead might bring some recompense for what you have forgone in order that the cost of living in South London might be subsidized; for that is what the control of prices by the Government has meant. But what share in the future is to be yours, I cannot prophesy. We are under threat of nationalization. The Company has taken, and will take, no part in party politics; but it is entitled to say that it believes with all sincerity that nationalization is as little in the interests of consumers as it is in the interests of proprietors.

Until the scheme for the Gas Industry is published, we are all more or less in the dark and can only draw what inferences we may from the measures already taken for other industries. You all, quite rightly, will be anxious to know how proprietors and employees of gas undertakings are to be treated under any legislation which is eventually passed. On this matter I can only say that, if nationalization is to be effected, your Directors will do their utmost to protect your interests and the interests of those who as employees have served you. There are, however, certain facts which I should like to set on record. At the end of 1946 there were 17,457 holders of Ordinary stock in the Company. Of these 7,578 had holdings up to £100; 7,489 held from £101 to £500; 1,452 held from £501 to £1,000; and 938—largely institutions and trustees for pensions and other funds—had holdings exceeding £1,000. Included in these numbers are 6,346 of your own employees and pensioners. There is little sign of the "financial speculator" here; rather the evidence is of the thrifty citizen who has not looked for large dividends or appreciation but, content with a modest return, has done his best to provide from his savings something for his dependants or his own old age. Now, if the proposals in the Electricity Bill are to pass unamended and are to be a pattern for a Gas Bill, stockholders are to suffer an enforced conversion which is tantamount to the confiscation of a third or even more of their income from their holdings. There is no need for me here to recount the fallacies and inequities of Stock Exchange quotations as the basis of compensation for public utility stocks. One can only hope and press that, whether it is transport, gas, or electricity which is being disinherited, some more equitable and creditable basis of compensation will be instituted than the Government have so far conceded.

Extensive Plant Programme

Meanwhile we have in no way halted or retarded the reconstruction and development which we had in mind before nationalization was threatened. The Report mentions the extensive programme which is being undertaken on the works and of which the chief item is the coke oven plant at East Greenwich. This type of plant, which will be of the latest design, is new to the Company's practice and we are confident that it will show appreciable advantages over the plant it will displace in thermal efficiency, economic running and working conditions. Another installation, a water gas plant, is also new to the Company and we are looking to it to increase the flexibility of our works in meeting speedily and economically variations in demand. The remaining major piece of work is the renewal of the second retort house at Rotherhithe; and the results from the first house which was recently finished and which is of similar horizontal design make us confident that the money will be well spent. The cost of this programme, which is estimated at £2,000,000, is being put to a works renewals suspense account, to be written off over 15 years, and the first instalment of £134,000 has been charged in the accounts for 1946.

The Report and Accounts were adopted; a final dividend of 3% on the Ordinary stock, making 5% for the year, was declared; Mr. A. B. Pasmore, O.B.E., D.L., and Sir H. Fortescue Flannery, Bart., M.B.E., were re-elected Directors; and Mr. F. J. Bradfield, F.C.I.S., was re-appointed an Auditor.

At a subsequent Extra-ordinary Meeting approval was given to the introduction of a Bill the objects of which are to give effect to the recommendation of the joint committee of both Houses of Parliament with regard to mains in highways and to authorize the establishment of a renewal fund.

Gas Undertakings' Results

South Staffordshire Mond Gas Company.—An Ordinary dividend of 3½%, against 1½% for the previous year, was declared on Feb. 27. Net profit for the year was £17,030.

Radiation, Ltd.—The Directors will recommend at the annual meeting on Mar. 26 an Ordinary dividend of 10%, less tax, for the year ended Dec. 31. Income for 1946 from subsidiary companies was £295,083 gross, £162,296 net, compared with £293,078 gross, £146,539 net, for the previous year.

Tottenham and District Gas Company.—Final dividends at standard rates on the Preference stock and at 2½% on Ordinary stock, making 5% for the year (the same as for 1945), will be proposed at the annual meeting on Mar. 25. Taxed profit for the year was £131,981, against £135,241 for the previous year.

Yorktown (Camberley) and District Gas and Electricity Company.—The Directors recommend an Ordinary dividend of 2¾% for the half-year to Dec. 31, making 5½% for the year, the same as for 1945. Profit on revenue account for the year was £31,427, against £37,255; undivided profit carried forward is £5,537, against £4,891.

South Suburban Gas Company.—Gas sales at 31,506,724 therms show an increase of 14.6% over 1945, and consumers increased by 5,123. Total revenue was £2,723,478, and expenditure was £2,404,519, leaving a balance carried to net revenue account of £318,959, against £293,944 for the previous year. Additional capital expenditure during the year included £12,637 for new mains and £24,104 for new meters to cover the requirements of additional consumers. Against these additions depreciation has been written off to the extent of £38,982, of which £30,632 has been applied to meters. After providing for an Ordinary dividend at the rate of 5%, the same as for the previous year, there is a surplus of £15,468.

Blyth Gas Company.—Revenue for 1946 amounted to £81,261 and expenditure to £70,737, leaving a profit on the year's working of £10,524, compared with £10,098 for the previous year. Dividend is maintained at 7% and the carry-forward is increased by £573 to £15,311. Gas sales yielded £60,299, against £56,968, and manufacturing costs were £50,122 compared with £48,511. Coal carbonized during the year totalled 18,244 tons, against 18,490 in 1945, and stocks on Dec. 31 were 1,799 tons against 1,343 tons twelve months earlier.

Liverpool Gas Company.—Net profit was £501,743 against the 1945 figure of £370,578. The balance brought forward from the previous year was £11,863 plus £9,449 freed reserve for hire purchase, making a sum available of £523,055. Of this sum, income tax took £101,755; provision for deferred repairs and renewals £310,000; interim dividend paid (less income tax) £33,934; and co-partnership bonus to employees £11,920. The result was a net figure of £65,446 out of which a final dividend of 2¾% (making 5½% per annum), absorbs £33,850, leaving £31,596 to be carried forward.